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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,835	03/17/2005	Jason Daniel Harold O'Connor	2135-00500	2402

23505 7590 11/03/2006

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EXAMINER	
RALIS, STEPHEN J	

ART UNIT	PAPER NUMBER
3742	

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

NT

Office Action Summary	Application No.	Applicant(s)	
	10/521,835	O'CONNOR, JASON DANIEL HAROLD	
	Examiner	Art Unit	
	Stephen J. Ralis	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 January 2005 and 18 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant is notified of receipt and acknowledgement, on 18 July 2006, of the amendments to Application No. 10/521,835, filed on 19 January 2005.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Patent No. 4,117,312) in view of Horsma (U.S. Patent No. 4,314,145).

Johnson et al. disclose an electric heating cable comprising: at least two power conductors 10, 12 extending along the length of the cable C and at least one heating

element 38 which extends along the cable and between the two conductors (10, 12), and connected in parallel between the conductors (i.e. heating material 38 continuously connected to conductors 10, 12), wherein at least one of the conductors is encased in a partial sheath 36 of material which has a temperature of coefficient of resistance material (i.e. layer 36 is coated on at least one of the conductors 10, 12, column 4, lines 25-38; see Figure 4; note: Figure 3 shows insulation jacket with slits 20, 22 and temperature of coefficient of resistance material 18 within the slits 20 between the conductor 10 and heating element 16; Figure 6 shows that insulation layers 58, 60 can partially or completely encase the conductors); and the heating element 38 electrically contacts the outer surface of the sheath 36 (column 4, lines 25-38; see Figure 4) such that the sheath is electrically connected in series between each heating element and the conductor encased by the sheath (column 4, lines 30-35); wherein the heating element 38 comprises a semi-conductor (i.e. thermoplastic material having graphite particles deposited within; column 8, claim14).

The claims differ from John et al. in calling for the PTC sheath to completely surround the conductor. However, electrode conductors for generating heat completely encased in a PTC layer/sheath, as described by Horsma, is known in the art. Horsma teaches electrodes of heat generating cables being 100% in contact with the PTC to provide not only for better electrical characteristics but also for ease of manufacture (column 7, line 52 – column 8, line 4; see Figures 1-8). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the partial layer PTC layer of Johnson et al. with the complete annular surrounding of the PTC

layer of Horsma to provide not only for better electrical characteristics but also for ease of manufacture.

With respect to the heating element comprising a heating wire instead of a continuously heating material, Johnson et al. disclose that Figure 3 (i.e. heating element comprising heating wire) is an equivalent structure known in the art with respect to Figure 4 (i.e. continuously heating material 38). Johnson et al. also disclose a heating wire 16, which extends along the cable and between the two conductors 10, 12, so as to define a series of heating elements connected in parallel between the conductor. Johnson et al. further disclose a temperature sensitive variable resistance material 18 connected to conductor 10 similarly as the coating layer 36. Therefore because these two heating elements were art recognized equivalents at the time of the invention was made and manufacturing of resistance wire elements is more cost effective than the process of a heating element material, one of ordinary skill in the art would have found it obvious to substitute the heating wire 16 for the heating material 38.

5. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heizer (U.S. Patent No. 6,144,018) in view of Horsma et al. (U.S. Patent No. 4,117,312).

Heizer discloses an electric heating cable comprising: at least two power conductors 1 extending along the length of the cable and at least one heating element (i.e. heating wire 5/8) which extends along the cable and between the two conductors 1 encased in an insulation sheaths 2 and connected in parallel between the conductors

(via alternating openings 4 along the length of the cable; column 3, lines 56-60); and the heating element (5, 8) electrically contacts the outer surface of the insulation sheaths such that the sheath is electrically connected in series between each heating element and the conductor encased by the sheath (see Figure 6).

The claims differ from Heizer in calling for at least one of the conductors is encased in a sheath of material that has a positive temperature coefficient. However, encasing at least one electrode conductor in a PTC sheath, as described by Horsma, is known in the art. Horsma teaches the surrounding of at least one electrode with a PTC sheath (Abstract; column 7, line 52 – column 8, line 4; see Figures 1-8) to provide to decrease the flow of current in response to the increased resistance, limiting power output from the cable, preventing the overheating of the heating cable, thereby increasing the overall safety of the device.

Heizer further discloses the first conductor 1 encased in an insulation sheath 2; a third sheath (i.e. insulator coat 3) encasing the first and second sheaths; portions of the third sheath being removed to cause the heating wire to contact the second sheath; the first sheath being in contract with the second sheath (see Figure 2); and portions of the first and third sheaths removed to cause the heating wire to contact the first conductor (column 3, lines 50-67, column 4, lines 1-2).

6. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Patent No. 4,117,312) in view of Horsma (U.S. Patent No.

4,314,145) as applied to claim 1 above, and further in view of Cole (U.S. Patent No. 4,684,785).

The Johnson-Horsma electrical heating cable combination discloses all of the limitations, as described in claim 1 above, except for the heating element comprising a material having a positive temperature coefficient (PTC) and a heating element comprising a material having a negative temperature coefficient (NTC). However, heating elements comprising PTC or NTC material, as described by Cole, is known in the art. Cole teaches that it is known in the art to have a PTC heating element (14) between two electrodes (10, 12; typical PTC cable; column 2, lines 24-52) to provide a heating element that uses the advantages of a positive temperature coefficient material (i.e. increase in resistivity with respect to temperature), thereby providing a better self-regulating heater. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heating element of the Johnson-Horsma electrical heating cable combination with the PTC heating element of Cole to provide a heating element that uses the advantages of a positive temperature coefficient material, thereby providing a self-regulating heater.

With respect to the limitation the heating element being an NTC material, Cole further teaches that is similarly known in the art to have an NTC material between two electrodes that uses the advantages of a negative temperature coefficient material (i.e. decrease in resistivity with respect to temperature), to provide a heating element that uses the advantages of a negative temperature coefficient material (i.e. decrease in resistivity with respect to temperature), thereby providing a better self-regulating heater.

With respect to the limitation of the positive temperature coefficient of the heating element and the positive temperature coefficient of the sheath of material being selected such that the cable is self-regulating up to a predetermined temperature at which it self-limits, the Johnson-Horsma-Cole electrical heating cable combination would have selective PTC material for both the heating element and the sheath, and this combination would inherently self-regulate the cable at a predetermined temperature. With respect to defining the predetermined temperature, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to select the PTC material of the heating element and the sheath such that the cable is self-regulating up to a predetermined temperature at which it self-limits, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

7. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heizer (U.S. Patent No. 6,144,018) in view of Horsma et al. (U.S. Patent No. 4,117,312) as applied to claim 1 above, and further in view of Cole (U.S. Patent No. 4,684,785).

The Heizer-Horsma electrical heating cable combination discloses all of the limitations, as described in claim 1 above, except for the heating element comprising a material having a positive temperature coefficient (PTC) and a heating element comprising a material having a negative temperature coefficient (NTC). However, heating elements comprising PTC or NTC material, as described by Cole, is known in

the art. Cole teaches that it is known in the art to have a PTC heating element (14) between two electrodes (10, 12; typical PTC cable; column 2, lines 24-52) to provide a heating element that uses the advantages of a positive temperature coefficient material (i.e. increase in resistivity with respect to temperature), thereby providing a better self-regulating heater. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heating element of the Johnson-Horsma electrical heating cable combination with the PTC heating element of Cole to provide a heating element that uses the advantages of a positive temperature coefficient material, thereby providing a self-regulating heater.

With respect to the limitation the heating element being an NTC material, Cole further teaches that is similarly known in the art to have an NTC material between two electrodes that uses the advantages of a negative temperature coefficient material (i.e. decrease in resistivity with respect to temperature), to provide a heating element that uses the advantages of a negative temperature coefficient material (i.e. decrease in resistivity with respect to temperature), thereby providing a better self-regulating heater.

With respect to the limitation of the positive temperature coefficient of the heating element and the positive temperature coefficient of the sheath of material being selected such that the cable is self-regulating up to a predetermined temperature at which it self-limits, the Heizer-Horsma-Cole electrical heating cable combination would have selective PTC material for both the heating element and the sheath, and this combination would inherently self-regulate the cable at a predetermined temperature. With respect to selecting specific PTC material defining the predetermined temperature

range at which it self-limits, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to select the PTC material of the heating element and the sheath such that the cable is self-regulating up to a predetermined temperature at which it self-limits, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Response to Arguments

8. Examiner accepts amendments to the Drawings, Title and Claims and respectfully withdraws the objections, accordingly.

9. Applicant's arguments with respect to claims 1-5 and 7-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stephen J Ralis
Examiner
Art Unit 3742

SJR
September 28, 2006

Robin D. Evans
ROBIN EVANS
SUPERVISORY PATENT EXAMINER
10/30/06